

(1). Please note that paragraph [1] has been amended as the followings:

[1] ~~The present invention is directed to prevent fogging of the windshield and to thaw accumulated ice on the windshield.~~ to devices designed to accomplish the following:

- To prevent fogging of the automobile windshield.
- To enhance thawing of ice accumulated on the automobile windshield.

(2). Please note that paragraph [2] has been amended as the followings:

[2] ~~Driving an automobile in the wet or cold climate, the moisture from the driver and passenger breathing forms a foggy layer on the windshield inside the automobile; which significantly reduces the driver visibility through the windshield and increases the risk of traffic accidents.~~ Fogging is caused by condensed water vapor collecting on a glass surface due to the difference in temperature between the glass surface and the adjacent air. Warmer air inside an automobile in contact with the windshield will be cooled down, the cooling of this air reduces its ability to retain moisture, and thus the moisture that is released condenses on the inside of the windshield. There are two different climate conditions in which fogging of the windshield occur even though the automobile has a ventilation system. First, in a cold climate, it occurs when the temperature inside the automobile differs significantly from the temperature outside. Secondly, in a wet climate such as a rainy day, it occurs when humidity inside the automobile is very high, the rain and wind keep the windshield cooler than air inside the automobile. When fogging of the windshield occurs, it significantly reduces the driver's visibility through the windshield, greatly increases the risk of traffic accidents. To address this issue, US patent 4786783 provides an electrically heated laminated windshield, and US patent 6668917 and 6155061 provide advanced HVAC systems. For average automobiles, the electrically heated laminated windshield is very expensive to produce, maintain and operate. The advanced HVAC systems that reduce fogging of the windshield are also too expensive for average automobiles.

(3). Please note that paragraph [3] has been amended as the followings:

[3] Also, in a cold climate, an automobile cannot be operated until the ice accumulated on the windshield is melted and removed. ~~A fairly long time is required to preheat the automobile interior space and melt the ice. To melt the ice, the time to preheat the automobile passenger compartment may be significant. To address this issue, US patent 6598653 provides a windshield cover to prevent ice accumulating. However, the windshield cover is easily stolen; also, after its use, the iced windshield cover may not be stored right way.~~

(4). Please note that paragraph [4] has been amended as the followings:

[4] Currently, there is ~~no known~~ not a simple, economic approach that can effectively address the ~~driving~~ safety concern related to fogging of the windshield in a wet or cold climate. Also, ~~On the other hand, there is also no known~~ not a simple, economic and effective way to quickly melt the accumulated ice on the windshield in a cold climate. to reduce the preheat time of the automobile interior space. Therefore, it is the objective of this invention to create a simple and economic solution to address the above issues effectively so that the automobile industry will adapt the solution and make driving safer and easier in a wet or cold climate. The characteristics of this invention will become apparent in light of the present specification, including claims, and drawings.

(5). Please note that paragraph [5] has been amended as the followings:

[5] It is an ~~object~~ objective of the present invention to ~~create a simple approach that~~ prevents fogging of the windshield in a wet or cold climate and thereby to improve driving safety.

(6). Please note that paragraph [6] has been amended as the followings:

[6] Another ~~object~~ objective of the present invention is to speed up the melting of ice accumulated on windshield ~~ice melting~~ in a cold climate so that an automobile can be operated soon after its engine warmed up ~~almost immediately~~.

(7). Please note that paragraph [7] has been amended as the followings:

[7] According to this the present invention, the windshield heating air appliance, dashboard air vents cover and flexible male and female connectors are ~~is made of transparent plastic or other transparent material as Figure 1 and Figure 2 illustrate.~~ The windshield, the windshield heating air appliance together create an isolated space adjacent to the internal windshield surface that can be quickly heated up through the heated air supply to prevent fogging of the windshield in a wet or cold climate and reduce the time required to melt the ice accumulated on the windshield in a cold climate. ~~and the automobile dashboard form a complete assembly henceforth referred as the "controlled heating air space" that is shown in Figure 9. The controlled heating air space can be quickly heated and maintained at an optimal temperature to prevent fogging of the windshield or reduce the time required to melt the ice on the windshield in a wet or cold climate.~~

(8). Please note that paragraph [7.1] has been added as the followings:

[7.1] This invention has the following major advantages:

- It provides a single solution to address multiple issues, which includes preventing fogging of the windshield, and reducing the time to melt ice accumulated on the windshield.
- The windshield heating air appliance is inexpensive.
- It does not occupy automobile passenger compartment usable room.
- Its installation is simple and easy.

(9). Please note that paragraph [8] has been amended as the followings:

[8] Figure 1 shows an external isometric view of the windshield heating air appliance with a female connector (1) and a rear view mirror base path (3). ~~a view from the outside of the automobile; Angle B of the dashboard support and the length of edges X and Y may vary based on size and position of the air vents. The windshield heating air appliance is attached to the windshield surface through the top, left, right and bottom T edges.~~

(10). Please note that paragraph [9] has been amended as the followings:

[9] Figure 2 shows a passenger side isometric view of the windshield heating air appliance.  
~~a view from the inside of the automobile; the dashboard support is attached to the~~  
~~dashboard surface.~~

(11). Please note that paragraph [10] has been amended as the followings:

[10] Figure 3 shows the windshield represented by thin dashed lines (4) and the windshield heating air appliance together to create an isolated space.  
~~a view from the outside of the~~  
~~automobile; the dashboard is shown at the bottom.~~

(12). Please note that paragraph [11] has been amended as the followings:

[11] Figure 4 shows an external view of the dashboard windshield air vents (5) and its cover (6) with a flexible male connector (2A).  
~~a view from the inside of the automobile; the~~  
~~dashboard is shown at the bottom.~~

(13). Please note that paragraph [12] has been amended as the followings:

[12] Figure 5 shows an external view of the dashboard (7) equipped with a dashboard windshield heated air outlet (8).  
~~a view from the outside of the automobile; the~~  
~~dashboard and the air vents are shown at the bottom.~~

(14). Please note that paragraph [13] has been amended as the followings:

[13] Figure 6 shows an external view of the dashboard windshield heated air outlet (8) attached with a flexible stand-alone male connector (2B).  
~~a view from the outside of the~~  
~~automobile; the dashboard and the air vents are shown at the bottom.~~

(15). Please note that paragraph [14] has been amended as the followings:

[14] Figure 7 shows a partial windshield heating air appliance edge with female buttons (9) and its corresponding male buttons (10) attached to the windshield surface.  
~~shaded~~  
~~surfaces of the windshield heating air appliance are designed to attach to the windshield~~  
~~surface.~~

(16). Please note that paragraph [15] has been amended as the followings:

[15] Figure 8 shows the partial windshield heating air appliance edge attached to the windshield. ~~the bottom surface of the shaded portion is designed to attach to the dashboard surface.~~

(17). Please note that paragraph [16] has been amended as the followings:

[16] Figure 9 shows a partial dashboard windshield air vents cover edge with female buttons (12) and its corresponding male buttons (13) attached to the dashboard surface. ~~that the windshield surface is represented by the solid thick line; the windshield heating air appliance surfaces are represented by the dashed line; the dashboard surface is represented by hatched lines at the bottom of the figure; this completes the assembly referred as the "controlled heating air space", which consumes less than 5% of the entire automobile interior space.~~

(18). Please note that paragraph [17] has been amended as the followings:

[17] Figure 10 shows the partial dashboard windshield air vents cover edge attached to the dashboard. ~~that a plastic windshield sunglass device is shown in A; the plastic windshield sunglass is attached to a hard handle on the right as shown in B; two handle holders attached to the windshield heating air appliance shown in C are used to lock the plastic windshield sunglass handle.~~

(19). Please note that paragraph [18] has been amended as the followings:

[18] Figure 11 shows view of the windshield heating air appliance comprised of two symmetric parts to facilitate shipping. ~~another type of plastic windshield sunglass that has a series holes located around its edges through which the plastic windshield sunglass is mounted on the windshield heating air appliance.~~

(20). Please note that paragraph [19] to [26] have been removed:

- [19] ~~Figure 12 shows a windshield heating air appliance with two plastic windshield sunglass devices; two shaded surfaces represent two plastic windshield sunglasses pulled out from the two plastic sunglass devices.~~
- [20] ~~Figure 13 shows a windshield heating air appliance with a series transparent plastic hollow columns that are mounts for installing plastic windshield sunglasses as shown in Figure 11.~~
- [21] ~~Figure 14 shows a windshield heating air appliance with two plastic sunglasses shown as shaded surfaces.~~
- [22] ~~Figure 15 shows a view from the outside of the automobile; adjustable windshield rear view mirror base holes are shown on the top.~~
- [23] ~~Figure 16 shows a view from the inside of the automobile; adjustable windshield rear view mirror base holes are shown on the top.~~
- [24] ~~Figure 17 shows a left view from the outside of the automobile.~~
- [25] ~~Figure 18 shows a different left view from the outside of the automobile.~~
- [26] ~~Figure 19 shows an automobile windshield heating air appliance related T edge sizes where the height is 1.5 inches and the width is 1.0 inches; the dashboard support edge size is 0.8 inches wide~~

(21). Please note that paragraph [27] has been amended as the followings:

- [27] According to the present invention, the windshield heating air appliance shown in Figure 1 is attached to the windshield by locking its edge female buttons (9) with male buttons (10) that are fixed to the windshield surface. The foam layer (11) seals the gap between the windshield heating air appliance edges and the windshield surface, thus creates an isolated space henceforth referred as the controlled windshield heating air space, between the windshield heating air appliance and the windshield. Similarly, the dashboard windshield air vents cover (6) is attached to the dashboard surface (7) by locking its edge female buttons (12) with male buttons (13) that are fixed to the dashboard surface (7). The foam layer (11) seals the gap between the dashboard windshield air vents cover edges and the dashboard surface (7), to keep heated air supplied by the dashboard windshield air vents within the dashboard windshield air

vents cover. Then the flexible male connector (2A) of the dashboard windshield air vents cover joins to the female connector (1) of the windshield heating air appliance, which assembles the windshield heating air appliance and the dashboard windshield air vents cover as a whole. Through a channel constructed by the dashboard windshield air vents cover (6) as well as the joint of the flexible male connector (2A) and female connector (1), heated air supplied by the dashboard windshield air vents (5) flows into the controlled windshield heating air space. is made of the transparent plastic or other transparent materials. The top, left, right and bottom T edges of the windshield heating air appliance are designed to attached to the windshield as shown in the shaded surfaces of Figure 7. The dashboard support edge is designed to attach to the dashboard as shown by the shaded surface in Figure 8. Figure 19 illustrates the dimensions of the T edge to be 1.5 inches tall and 1.0 inches wide and dashboard support edge to be 0.8 inches wide. Figure 5 and Figure 6 show the dashboard air vents are located between the windshield and the windshield heating air appliance. The windshield, the windshield heating air appliance and the automobile dashboard form a complete assembly henceforth referred as the "controlled heating air space" where the controlled heating air space can be quickly heated and maintained at an optimal temperature using the hot air supply from the dashboard air vents. Thus, the moisture from the passenger breathing can no longer form a foggy layer on the heated windshield and windshield heating air appliance. This ensures the best driver visibility in a wet or cold climate.

(22). Please note that new paragraph [27.1] to [27.4] have been added right after the paragraph [27] as the followings:

[27.1] Alternatively, the dashboard windshield air vents (5) are replaced by the dashboard windshield heated air outlet (8) to reduce the dashboard windshield air vent cost. A flexible stand-alone male connector (2B) is attached to the dashboard windshield heated air outlet (8) to retain heated air. The flexible stand-alone male connector (2B) joins to the female connector (1) of the windshield heating air appliance, which assembles the windshield heating air appliance and the flexible stand-alone male connector (2B) as a

whole. Through a channel constructed by the flexible stand-alone male connector (2B) as well as the joint of the flexible stand-alone male connector (2B) and female connector (1), heated air supplied by the dashboard windshield heated air outlet (8) flows into the controlled windshield heating air space.

[27.2] The controlled windshield heating air space is less than 1% of the automobile passenger compartment; therefore, using heated air supplied by either dashboard windshield air vents (5) or a dashboard windshield heated air outlet (8), the controlled windshield heating air space can be quickly heated up, and the internal windshield surface can be maintained at an optimal temperature. As a result, the heated internal windshield surface no longer causes adjacent air to transfer moisture, which prevents fogging of the windshield, and ensures the best driving visibility in a wet or cold climate.

[27.3] Furthermore, the controlled windshield heating air space can maintain the windshield surface at a relatively high temperature in a very cold climate, this can prevent the windshield from a dangerous "flash freeze" situation which may occur when water at or near freezing point strikes a relatively cool windshield while it is in motion, such as when cold water is splashed up onto a car windshield by a passing tractor-trailer.

[27.4] According to this invention, the windshield heating air appliance is made of transparent materials such as plastics that will not be broken into pieces during an automobile crash. The dashboard windshield air vents cover (6) and flexible stand-alone male connector (2B) are also made of transparent materials.

(23). Please note that paragraph [28] has been amended as the followings:

[28] When an automobile is parked in a parking lot or on the street in a cold climate, the normal practice to melt ice on the windshield is to preheat the automobile passenger compartment interior space ~~interior space which takes fairly long time~~. Since the "controlled heating air space" is ~~consumes~~ less than 15% of an automobile passenger compartment interior space, it takes much less time to heat up the "controlled heating air space" compared to the entire automobile passenger compartment interior space; thus it takes much a shorter time to heat up the windshield, melt ice accumulated on the windshield,



and reduces pollution. ~~A shorter time to melt the ice on the windshield saves energy and reduces pollution.~~

(24). Please note that paragraph [29] and [30] have been removed:

- [29] ~~The large soft plastic windshield sunglass is another feature of the windshield heating air appliance. A rotatable plastic sunglass device as shown in Figure 10 is designed for simplicity. To use the plastic windshield sunglass when driving on a sunny day, just pull out the plastic windshield sunglass hard handle and lock the hard handle into the two handle holders on the windshield heating air appliance as shown in Figure 12. To put away the sunglass before driving when sunny conditions are not present, just release the hard handle from the handle holders, the rotatable plastic sunglass device automatically rotates the plastic windshield sunglass out of view.~~
- [30] ~~Another plastic windshield sunglass design is shown in Figure 11. Each plastic windshield sunglass has a series holes spreading on its edges, the windshield heating air appliance has a series hollow columns as shown in Figure 13. The columns are used as mounts for corresponding plastic windshield sunglasses. Figure 12 shows the windshield heating air appliance with plastic windshield sunglasses.~~

(23). Please note that paragraph [31] has been amended as the followings:

- [31] Some automobile models have the rear view mirror base attached to the ceiling. Others automobiles have the rear view mirror base attached to the windshield. ~~To handle the case where the rear view mirror base is attached to the windshield, the windshield heating air appliance could be cut open to accommodate the rear view mirror base as shown in Figure 15 and Figure 16.~~ To accommodate the need for the rear view mirror base attached to the windshield, the windshield heating air appliance has an open path (3) shown in Figure 1 and Figure 2 to fit the rear view mirror.